

PATENT COOPERATION TREATY

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INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY
(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

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|---|---|---|
| Applicant's or agent's file reference P14110-mek | FOR FURTHER ACTION See Form PCT/IPEA/416 | |
| International application No. PCT/SE2005/000437 | International filing date (day/month/year) 23-03-2005 | Priority date (day/month/year) 26-03-2004 |
| International Patent Classification (IPC) or national classification and IPC See Supplemental Box | | |
| Applicant Andrew Corporation et al | | |

1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.
2. This REPORT consists of a total of 4 sheets, including this cover sheet.
3. This report is also accompanied by ANNEXES, comprising:
 - a. ☒ (sent to the applicant and to the International Bureau) a total of 7 sheets, as follows:
 - ☒ sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).
 - ☐ sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.
 - b. ☐ (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) _____, containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).

4. This report contains indications relating to the following items:

- | | | |
|-------------------------------------|--------------|---|
| <input checked="" type="checkbox"/> | Box No. I | Basis of the report |
| <input type="checkbox"/> | Box No. II | Priority |
| <input type="checkbox"/> | Box No. III | Non-establishment of opinion with regard to novelty, inventive step and industrial applicability |
| <input type="checkbox"/> | Box No. IV | Lack of unity of invention |
| <input checked="" type="checkbox"/> | Box No. V | Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement |
| <input type="checkbox"/> | Box No. VI | Certain documents cited |
| <input type="checkbox"/> | Box No. VII | Certain defects in the international application |
| <input type="checkbox"/> | Box No. VIII | Certain observations on the international application |

| | |
|---|--|
| Date of submission of the demand 25-01-2006 | Date of completion of this report 11-04-2006 |
| Name and mailing address of the IPEA/SE Patent- och registreringsverket Box 5055 S-102 42 STOCKHOLM Facsimile No. +46 8 667 72 88 | Authorized officer Stefan Dufva / MRO Telephone No. +46 8 782 25 00 |

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2005/000437

Supplemental Box

In case the space in any of the preceding boxes is not sufficient.

Continuation of: Cover sheet

International patent classification (IPC)

H04Q 7/30 (2006.01)

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2005/000437

Box No. I Basis of the report

1. With regard to the
- language**
- , this report is based on:



the international application in the language in which it was filed

a translation of the international application into _____,
which is the language of a translation furnished for the purposes of:

international search (Rules 12.3(a) and 23.1(b))



publication of the international application (Rule 12.4(a))



international preliminary examination (Rules 55.2(a) and/or 55.3(a))

2. With regard to the
- elements**
- of the international application, this report is based on
- (replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report)*
- :



the international application as originally filed/furnished



the description:

pages 1 - 27 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____



the claims:

pages _____ as originally filed/furnished

pages* _____ as amended (together with any statement) under Article 19

pages* 1 - 7 received by this Authority on 25-01-2006

pages* _____ received by this Authority on _____



the drawings:

pages 1 - 7 as originally filed/furnished

pages* _____ received by this Authority on _____

pages* _____ received by this Authority on _____



a sequence listing and/or any related table(s) – see Supplemental Box Relating to Sequence Listing.

- 3.
- ☐
- The amendments have resulted in the cancellation of:



the description, pages _____



the claims, Nos. _____



the drawings, sheets/figs _____

the sequence listing (*specify*): _____any table(s) related to the sequence listing (*specify*): _____

- 4.
- ☐
- This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).



the description, pages _____



the claims, Nos. _____



the drawings, sheets/figs _____

the sequence listing (*specify*): _____any table(s) related to the sequence listing (*specify*): _____

* If item 4 applies, some or all of those sheets may be marked "superseded."

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

International application No.

PCT/SE2005/000437

Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

| | | | |
|-------------------------------|--------|-------------|-----|
| Novelty (N) | Claims | <u>1-31</u> | YES |
| | Claims | | NO |
| Inventive step (IS) | Claims | <u>1-31</u> | YES |
| | Claims | | NO |
| Industrial applicability (IA) | Claims | <u>1-31</u> | YES |
| | Claims | | NO |

2. Citations and explanations (Rule 70.7)

The claimed invention

The claimed invention relates to an indoor base station suited for implementation at hotspots where many users are located in a relatively small area.

The following document are cited in the International Search Report:

D1: US 6640110 B1

D2: WO 0106801 A1

D3: US 5995851 A1

D1 and D2 are considered to represent closest prior art. D2 has priority from D1.

D1 discloses a scalable cellular communications system. D1 describes in column 8 line 65 - column 10 line 46 a module housing structure. In figure 8, it is shown how a base station comprises an outer casing or support unit (125) and a cavity (112) in which an RF amplifier printed circuit board and a power supply are housed.

However, D1 fails to disclose the docking of a complete base station unit to a support unit. D1 merely discloses attachment of separate modules of the base station unit to each other. D1 also fails to disclose the use of releasable engagement by means of snap locking means.

The same argumentation is valid for D2.

D3 is considered to merely disclose the state of the art and is not commented on further.

Consequently, the claimed invention as in claim 1-31 is novel, considered to involve an inventive step and has industrial applicability.

25-01-2006

CLAIMS

1. A base station (100) devised for indoor use in a WCDMA network,
comprising a support unit (401) including a power supply unit (303), said
5 support unit (401) being adapted to be attached to a support structure, and a
complete base station unit (402) mechanically supported by said support unit,
characterised in that said complete base station unit (402) is designed as a
separate docking unit locked in said support unit (401) by cooperating snap
locking means (602, 703) arranged in said support unit (401) and base station
10 unit (402), allowing an easy installation/removal of said complete base
station unit (402) in/from said support unit (401).
2. The base station (100) according to claim 1 further **characterised in** that
said power supply unit (303) housed in said support unit (401) comprises an
15 AC/DC converter feeding said complete base station unit (402) with a DC-
voltage.
3. The base station (100) according to any of claims 1 to 2 further
characterised in that said base station unit (402) has a sandwich structure
20 comprising a rigid metal back plate (1201), a rigid metal front plate (1208),
and a main circuit board (1206) attached intermediate said back plate and
front plate (1208).
4. The base station (100) according to claim 3 wherein said rigid metal back
25 plate (1201) comprises cooling flanges (1601).
5. The base station (100) according to claim 4 wherein said back plate's (1201)
cooling flanges (1601) are arranged on the side facing away from said circuit
board (1206) whereby said main circuit board (1206) is cooled by means of
30 self-convection through said back plate (1201).

6. The base station (100) according to any of claims 3-5 wherein all circuits of a control processing block, a base band processing block and an RF block are arranged on said main circuit board (1206).
- 5 7. The base station (100) according to claim 6 further **characterised in that** said main circuit board (1206) comprises border portions (1207) dividing the main circuit board in sections with separate circuits for said blocks, and where said front plate comprises inner walls (1501) with end portions engaging said border portions (1207) for shielding said separate circuits from
10 each other.
8. The base station as recited in any of claims 3-7 further **characterised in that** it comprises a transmission interface block realised in form of a separate circuit board (1210), which is attachable to the main circuit board (1206) by
15 means of a contact interface, thereby allowing an easy substitution of said circuit board (1210).
9. The base station (100) according to any of the preceding claims **characterised in** that said support unit (401) comprises support members
20 (601) and said base station unit (402) comprises cooperating hanger members (701) which are devised to connect to said support members (1601) in a pivoting engagement, and wherein said snap locking means (602, 703) are included in said support (401) unit and in said base station unit (402), which are devised to engage with each other by pivoting said base station
25 unit.
10. The base station (100) according to claim 9 **characterised in** that said snap locking means (602, 703) are formed by an inwardly projecting knob on a side wall of the support unit (401), and a cooperating recess in the base
30 station unit (402), wherein engagement of the knob and the recess locks said base station unit (402) from moving vertically upwards and horizontally

outwards from the support unit (401).

11. The base station (100) according to claim 9 **characterised in** that said snap locking means are realised by means of spring-loaded engaging means
5 arranged on a side wall of said support unit (401) and a cooperating recess in a side wall of said base station unit (402).
12. The base station (100) according to any of the preceding claims
10 **characterised in** that said base station (100) comprises at least one interface for connecting an external alarm equipment with the control processing circuit (1404) of said base station (100), thereby allowing the establishment of a communication channel between said external alarm equipment and a central alarm station.
13. The base station (100) according to any of the preceding claims
15 **characterised in** that said base station (100) comprises a handle (702) at a side portion, allowing the base station to be carried.
14. The base station (100) according to claim 13 **characterised in** that said
20 handle (702) is arranged on the lower end of said base station unit (402), when the base station unit (402) is installed in said support unit (401), and that said handle (702) further comprises a cable race groove.
15. The base station (100) according to claim 14 **characterised in** that at least
25 one cable contact is positioned at the lower end of said base station, when the base station unit (402) is installed in said support unit (401), under said handle and tilted about 45 degrees.
16. The base station (100) according to any of the preceding claims
30 **characterised in that** it comprises an internal antenna (403) covered by a front cover (404) of an electromagnetically transparent material.

17. Base station (100) devised for indoor use in a WCDMA network, comprising a base station unit (402) having an interface (1405) for connection to a power supply (303), a radio network controller, RNC, and to an antenna (403), said
5 base station unit having a sandwich structure comprising a rigid metal back plate (1201), a rigid metal front plate (1208), and a main circuit board (1206) attached intermediate said back plate (1201) and front plate (1208), wherein all circuits of a control processing block (1404), a base band processing block (1402) and an RF block (1401) are arranged on said main circuit board
10 (1206).
18. The base station as recited in claim 17, wherein said rigid metal back plate (1201) comprises cooling flanges (1601).
- 15 19. The base station as recited in claim 18, wherein said cooling flanges (1601) are arranged on a side facing away from said circuit board (1206), and wherein said main circuit board (1206) is cooled by means of self-convection of said back plate.
- 20 20. The base station as recited in any of claims 17-21 further **characterised in that** said main circuit board (1206) comprises border portions (1207) dividing the main circuit board in sections with separate circuits for said blocks, and where said front plate (1208) comprises inner walls (1501) with end portions engaging said border portions (1207) for shielding said separate
25 circuits from each other.
21. The base station according to any of claims 17-20, wherein said front plate (1208) comprises a mechanical interface for attaching an internal antenna (403), and wherein said antenna is covered by a front cover (404) of an
30 electromagnetically transparent material.

22. The base station as recited in any of claims 19-20 further **characterised in**
that the control processing block (1404) and Radio Frequency block (1401)
of said main circuit board (1206) are arranged in separate shielded
compartments formed between said front plate (1208) and back plate (1201),
5 whereby said control processing block (1404) and Radio Frequency block
(1401) are electromagnetically shielded from other electric circuits of the
base station (100).
23. The base station as recited in any of claims 18-22 further **characterised in**
10 **that** a transmission interface block is realised on a separate circuit board
(1210), which is attachable to the main circuit board (1206) by means of a
contact interface, thereby allowing the easy substitution of said circuit board
(1210).
- 15 24. The base station according to claim 23 further **characterised in that** said
circuit board (1210), a base band processing block (1402) and a DC/DC
block (1403) of said circuit board (1206), are arranged in separate shielded
compartments formed between said front plate (1208) and back plate (1201),
and whereby said circuit board (1210), base band processing block (1402)
20 and DC/DC block (1403) are electromagnetically shielded from other electric
circuits of the base station (100)..
25. A cellular radio network, including one or more macro base stations,
characterised in that said network further comprises a base station
25 according to any of claims 1-24.
26. Method for assisting the installation of a base station (100) for indoor use in
a WCDMA network, which base station comprises a support unit (401)
including a power supply unit (303), and a complete base station unit (402)
30 mechanically supported by said support unit (401), comprising the steps of:
- mechanically attaching said support unit (401) to a support structure;

- mechanically docking said base station unit (402) into the support unit (401) by engaging cooperating snap locking means (602, 703) arranged in said support unit (401) and said base station unit (402);
- connecting the base station unit to a radio network controller, RNC, of said network, to an antenna (403), and to said power supply unit (303); and
- downloading application software and office data from a management tool to said base station unit, allowing the establishment of a communication channel between said base station unit (402) and said RNC .

27. The method according to claim 26 wherein said step of mechanically attaching said base station unit (402) to the support unit (401) comprises the following steps:

- engaging hanger members (701) of said base station unit (402) with cooperating support members (601) of said support unit (401), and,
- pivoting said base station unit (402) into engagement of cooperating snap locking means (602, 703) arranged in said support unit (401) and said base station unit (402).

28. The method according to any of claims 26-27 further comprising the steps of:

- connecting an external alarm equipment to said base station unit (402),
- downloading specific software for said external alarm equipment to the control block unit (1404) of said base station unit (402), allowing the establishment of a communication channel between said alarm equipment and a central alarm station.

29. The method as recited in claim 26, comprising the step of :

- connecting said management tool directly to said base station unit by means of a Local Management Tool, for direct downloading of said application software and office data to the base station unit.

30. The method as recited in claim 26, comprising the step of :

- connecting said management tool to a central radio network controller, RNC, of said network, for downloading of said application software and office data to the base station through said network.

5

31. Method for assembly of a base station unit as recited in any of claims 17-24, comprising the steps of;

- placing the back plate (1201) on an assembly support;
- placing the circuit board (1206) on the back plate (1201);
- attaching the circuit board (1206) to the back plate (1201);
- placing the front plate (1208) on the circuit board (1206); and
- attaching the front plate (1208) to the back plate (1206).

10